DOCUMENT RESUME

ED 246 080 TM 840 351

AUTHOR Sakamoto, Takashi
TITLE Characteristics of Study Skills in Japanese Pupils.
PUB DATE Apr 84
NOTE 21p.; Paper presented at the Annual Meeting of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Elementary Secondary Education; Foreign Countries; Program Evaluation; *Questionnaires; *Student Attitudes; *Study Habits; Study Skills; Test Construction
IDENTIFIERS Japan; Japanese Studies

ABSTRACT

The study was conducted utilizing the instrumental approach to the development of study behaviors. The hypothesis was that a pupil's academic performance, study motivation, and creativity can be improved by encouraging his/her study skills. The practical aims were delineated and explained. The research was conducted in stages. These included discovery of the most effective study behaviors; design and implementation of a student questionnaire; data analysis; diagnosis of study behaviors; development of a program for improving study behaviors; encouragement for improvement of study behaviors; and evaluation. The results of the study indicated cognitive factors were an important component of study skills at all grade levels. Study motivation was less important to achievement in logical subject matter, such as science and mathematics. The effects of computer output advice on scholastic performance were evaluated and found to be inconclusive. Questionnaires are included in the appendices. (DWH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED246080

Symposium paper presented at the
AERA (Division H) annual meeting
in New Orleans, April 1984.

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
T Sakamoto
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Characteristics of Study Skills in Japanese Pupils

Takashi Sakamoto
Tokyo Institute of Technology

PROBLEM It has been said that there has been an increase in the number of pupils declining in academic performance, and lacking motivation and study skills. Our main task is to enhance study behaviour.

There are two psychological approaches to the development of study behaviours : cognitive and instrumental. In the cognitive approach, a model is formalized in terms of cognitive science concepts : short-term memory, long-term memory, knowledge structure, information processing, learning strategy, etc. Based on such a model, the structure and function of student study skills are analyzed and means for improving study skills are prescribed. In the instrumental approach, actual study behaviours are identified, statistically analyzed, and structured. Based on this information, effective study behaviours are set as educational goals, and techniques for improving study skills are determined.

Our work utilizes the instrumental approach.

HYPOTHESIS Our hypothesis is that we can improve pupil's academic performance, study motivation, and creativity by encouraging their study skills.

TM 840 351

Those who are low in performance, study motivation, and/or creativity can perhaps be trained to attain a higher level of competence in these areas by acquiring the study skills of other pupils who already demonstrate high levels of competence.

For example, if a pupil showing high motivation for study demonstrates such study skills as "solving problems by focusing on the main points," "applying his or her own ideas", and "asking teachers to clarify difficult material", we could expect pupil showing low motivation for study to increase in motivation after being trained to practice the above-mentioned study skills in learning situations.

PURPOSE The practical aims of this study are :

1. To list the most effective study skills that pupils used.
2. To examine in detail the most effective study skills practiced by pupils exhibiting higher levels of study motivation, creativity, and/or scholastic performance.
3. To determine relationships between study skills and other characteristics, such as study motivation, creativity, and /or scholastic performance.
4. To develop a computer-based advisory system for developing study skills in order to improve study motivation, creativity, and/or scholastic performance.
5. To train pupils to use these skills according to the advice given.
6. To evaluate the effectiveness of this training.

PROCEDURES This study was conducted in eight stages :

1. Discovery of the most effective study behaviours

   A list of the most effective study behaviours that pupils had used was made, and consolidated into several categories to describe specific study skills.

2. Design of the questionnaire

A 30-item (five point scale) questionnaire (S-L4) for determinig specific study skills was designed. In revision, 23 and 24 (L-5) item questionnaires were designed for primary and secondary school pupils. (Appendix 1& 2)

3. Implementation of the questionniare

Primary and secondary school pupils filled out the study skill questionnaire, as well as a 32-item 5 point scale questionnaire on study motivation. (Appendix 3) In addition, scholastic performance scores for each pupil or student were collected. The subjects totaled over 5,000 pupils, as shown in Table 1.

Insert Table 1 About Here

4. Data analysis

The 5 most highly rated study skill items were selected. Similarly, the 6 highest and 6 lowest motivation items were selected. The data was analyzed by factor analysis using principal component and varimax rotation methods. Using the two or three items with highest loadings on each factor, a study skill score for each pupil was obtained and a study motivation score was also calculated for each of 8 different types of motivation. Then the relationships among study skill scores, scholastic performance, and study motivation scores were calculated.

5. Diagnosis of study behaviours

The study skills and study motivation of each pupil and the respective characteristics and degrees of these competencies in each pupil were assessed.

6. Program for improving study behaviours

A computer-aided advisory system for improving study skills of each pupil was developed so that he/she might achieve better scholastic results and

a higher level of study motivation.

7. Encouragement to improve study behaviours

An individualized advisory sheet was prepared and given to each pupil. Each pupil was encouraged to improve his /her study behaviours by adhering to this advice. Control group pupils were not given advisory sheets.

8. Evaluation

Two kinds of evaluation were done. First, pupils were asked to answer on questionnaire dealing with the effectiveness of the advisory sheet. Secondly, the effectiveness of the advisory sheets was evaluated by comparing changes in scholastic performance and study motivation in experimental and control groups.

RESULTS

1. Study skills

(1) Items rated high and low among study skills

Items with higher ratings were similar among school grades in primary and lower secondary schools. The highest 5 and the lowest rated 5 items in primary and lower secondary schools are shown in Table 2. There were no major sex differences, although females made slightly higher ratings than males.

Insert Table 2 About Here

(2) Structure of study skills

Factor analysis revealed three factors at each school level : cognitive, human contact, and searching in primary school ; cognitive, visual cueing and human contact in lower secondary school ; and cognitive, visual cueing, and voicing in upper secondary school. These are shown in Table 3.

Insert Table 3 About Here

2. Study motivation

(1) Items rated high and low in study motivation

Table 4 shows the highest 6 and the lowest 5 or 6 study motivation items for primary school and lower secondary school. Table 5 shows the mean ratings of study motivation for each of 8 different types of study motivation found in a previous study (Sakamoto et al. 1980) : Relating, Outreaching, Seeking, Forward, Obedient, Integrative, Persevering, and Creative. These sere defined by the combination of three factors, i.e., dynamic (static-dynamic) , groupness (initiative-cooperative) and verboness (behavioural-verbal) .

Insert Table 5 About Here

3. The relationship between study skills and scholastic performance

Tables 6 and 7 show the mean ratings of study skills for each study skills factor for higher level groups and lower level groups. These groupings are based on the results of a "good-poor" analysis of scholastic performance in primary and lower secondary schools. Data were obtained from those who performed in the top 10 % of the sample and from the lowest 10 %.

Insert Table 6 & 7 About Here

4. The relationship between study motivation and scholastic performance

Table 8 shows the mean ratings for each type of study motivation, for the top and bottom 10% of the primary school and secondary school pupils.

Insert Table 8 About Here

5. The relationship between study skill and study motivation

Table 9 shows the items of study skills which have higher correlation (over 0.5) to each type of study motivation.

Insert Table 9 About Here

DISCUSSION

1. Study skills

In primary school, searching activity such as "I use a dictionary to study", human contact such as "I look at a person's face when we are talking", or "I study with friends", and persistent behaviours such as "When I don't get something, I read it over and over" and "I read things over and over again to memorize" were very highly rated in importance. These seem to be conative, goal seeking and cooperative behaviours. In contrast, static behaviour such as "I make up charts or graphs when I read" and competitive behaviour such as "I do problems by competing with friends" were not highly rated. Primary school teachers might ask children to explore and discover things, and to cooperate in classroom studies. Therefore, goal seeking and cooperative behaviour would be of useful study skills for primary school children.

In secondary school, passive activities such as visual cueing were important, but active thinking such as "When I read a book I sum it up in my own way", "When I investigate something, I have my own way of looking at it" and active behaviours such as "When I don't understand, I ask the teacher" were less important.

Factors found in Table 3 also reveal that cognitive factors seemed important from primary school level through secondary school level. In primary school level group activities and active behaviours such as searching were more notable, but in secondary school level individual behaviours and reduced activities as visual ceuing and voicing were be more dominant.

These characteristics seemed to be due to the trends of child development from concrete to logical thinking (Piaget, J. 1953) and changes of weight in teachers' assessment from total activities to scholastic performance. Concerning the latter, written tests are often utilized in secondary school classrooms and in entrance examinations for higher education. Moreover, in primary school outreaching and active behaviours such as searching, human contact and cognitive activities, may be most important for scholastic performance (as shown in Table 6) . In addition, assessment usually would be done in terms of total activities in children. In secondary school, however, passive behaviours in visual cueing and cognitive activities may be more effect for gaining better scholastic performance, (See Table 7) because most of assessment would be done by written tests. Human contact is not always related to get better scholastic performance in secondary school. This could make pupils egoistic and less cooperative in classroom activities. Perhaps teachers should consider good human contact with others in order to evaluate such pupils more fully.

2. Study motivation

Concerning study motivation items (Tabel 4) , rigid and punctual behaviours like "When a vacation begins, I make up a schedule for study and activity", "When I don't understand something, I don't leave it unfinished", "I try to help my group do its job smoothly" and "My desk is organized neatly " were often found. In primary school, home works was important, while secondary school pupils showed flexible behaviours such as "When there's a hard problem, I think about it many ways without giving up " and "I try to help my group do its job smoothly". In contrast, pupils rated lowly active behaviours such as "If I don't understand my teacher, I ask him questions ", "I review my lessons every day ", "I study well even for a short time" and "When I read, I collect the main points of the book". Pupils stressed obedience and persistence more in primary school while "forward ", "integrative "and " persevering" types of study motivation were less shown

in secondary school.

Concerning the correlation between study motivation and achievement measures are concerned, Japanese and arithmetic seemed to be more affected by study motivation in primary school. Japanese, social studies and English were more highly correlated with motivation in secondary school. As shown in Table 8, these study motivation was not so important in logical subject matter such as science and mathematics. It seems as important to gain effective study skills as well as higher study motivation.

3. Effectiveness of computer aided advisory system

Some students were given sheets of computer output advice which recommend them to practice (Appendix 4) . Advice was made based on the items which are important to them but which are not enough conducted.

Table 10 shows the subjective evaluation of effects of computer output advice in a secondary school. Advice seemed to be suitable for them. Table 11 shows the growth in study skills and study motivation during one semester. It seemed that the advice might be more or less effective.

However, the effects of computer output advice to scholastic performance were not clear yet at the moment.

Reference

1. Piaget, J. (1953) Logic and Psychology. Manchester : Manchester University Press.

2. Sakamoto, T., Kimura, K., Muta, H., Shimada, M. & Nagaoka, K. (1980) Research on Methods for Developing Motivation for Learning. Educational Technology Research, 4, 1-21.

Appendex 1.

Questionnaire S, PRIMARY : STUDY SKILLS

How do you study? Please circle the number to the right that tells how often each of these 23 things is true about you.

KEY : If it's always true about you, circle "5".
If it's usually true, circle "4".
If you can't really say, circle "3".
If it's rarely true, circle "2".
If it's never true about you, circle "1".

1. When I read, I mark or underline things.
2. I make up charts or graphs when I write.
3. I outline main points.
4. I study with friends.
5. I use a dictionary to study.
6. I remember by studying the main point.
7. I look up things when I don't understand.
8. I do problems by competing with friends.
9. When I don't get something, I read it over and over.
10. When I don't understand, I ask the teacher.
11. I use graphs and charts to do problems.
12. I make notes when I don't understand.
13. I look at a person's face when we are talking.
14. I read things over and over again to memorize.
15. I make charts and graphs of things I study about.
16. When I take notes, I put in my own ideas.
17. I mark or underline things to remember them.
18. When I read, I think about the main idea.
19. I take notes to prepare for class.

20. I learn about things by seeing them for read.

21. When I look something, up, my own ideas are important.

22. I remember things from class if they matter to me.

23. I write down what I can or cannot figure out.

Appendix 2.

Questionnaire S, SECONDARY : STUDY SKILLS

(Identical instructrions are given as in primary study skills)

1. I write out sentences as I copy them.

2. When I read, I mark or underline the important parts.

3. I write an outline of the main points.

4. I study with friends.

5. To memorize, I look at the main point.

6. I listen carefully to points in class that seem important to me.

7. I look up parts I don't understand.

8. When I read a book, I sum it up in my own way.

9. I read aloud.

10. I solve problems from easiest to hardest.

11. I concentrate on the main point while listening in class.

12. When I don't understand, I ask the teacher.

13. I study by using reference books or study guides.

14. I memorize things in order of importance to me.

15. When I don't understand something, I read it over and over again.

16. I focus on the main point when I read.

17. I look up other subjects related to the class materials.

18. When taking notes, I underline important parts.

19. I memorize by saying things aloud.

20. When I memorize things, I mark or underline them.
21. When I read, I think about the main idea.
22. I memorize things by competing with friends.
23. I learn about things by actually seeing them.
24. When I investigate something, I have my own way of looking at it.

Appendix 3.

Questionnaire M, CLASSROOM MOTIVATION

(Identical instruction are given as in primary study skills)

1. If I spot something interesting, I will find out more about it to share with the class.
2. When there's a hard problem, I think about it many ways without giving up.
3. I solve problems thoroughly.
4. When I have an opinion, I am quick to speak up.
5. I listen carefully during speeches.
6. I listen carefully to get the ideas of friends.
7. I review my lessons every day.
8. I take the lead in making a plan to study or play.
9. I try to find the best way to don any job.
10. I like to work out problems.
11. If I don't find what I expect to, I try to figure out why.
12. If I don't understand my teacher, I ask him questions.
13. I study in the way I plan to.
14. When I read, I collect the main points of the book.
15. When there is a difficult problem, I enjoy the challenge.
16. When a vacation begins, I make up a schedule for study and activity.
17. If a friend isn't cooperative, fI get him to join the group.

18. I always try to complete what I do.

19. I enjoy new subjects.

20. I don't put things off.

21. I don't forget homework.

22. I study well even for a short time.

23. I finish my homework by myself, even when there is a lot of it.

24. I make a study schedule when a new term begins.

25. I try to help my group do its job smoothly.

26. When I don't understand something, I don't leave it unfinished.

27. When I fail, I try to find out why.

28. When I don't understand something, I study it until I do understand.

29. When class is to begin, I sit and wait for the teacher.

30. My desk is organized neatly.

31. I don't give up easily even when I don't understand.

32. I sometimes change how I study to find the best way to study.

Appendix 4 An example of computer output advice

Sixth grade, class 1, pupil #1 (male)

You have apotentiality to get better in scholastic performance.

You seem to be not enough good at studying.

We recommend you to practice the following things in your studies.

Read things over and over agaion to memorize

Look up things when you don't understand.

Remember by studying the main points.

Think about the problem many ways without giving up even if it is hard.

Study until you do understand, even if you don't understand something.

Listen carefully to get the idea of friends.

Table-1. Number of subjects

		S-LA	S-LS		
			Male	Female	Total
Primary school	4	254	106	116	222
	5	272	159	139	298
	6	289	315	306	621
	T	815	580	561	1141
Lower Secondary School	1	297	61	63	125
	2	267	461	427	888
	3	238	77	71	148
	T	802	599	562	1161
Upper Secondary School	T	1150	/	/	/
Total		2767	1179	1123	2302

Table-2. Items which are high and low in study skills

	High		Low	
	No.(mean)	content	No.(mean)	content
Primary School	5 (3.6)	I use a dictionary to study.	2 (2.6)	I make up charts or graphs when I read.
	13 (3.5)	I look at a person's face when we are talking.	15 (2.6)	I make charts and graphs of things I study about.
	9 (3.3)	When I don't get something, I read it over and over.	8 (2.7)	I do problems by competeing with friends.
	14 (3.3)	I read things over and over again to memorize.	17 (2.7)	I make notes when I don't understand.
	4 (3.2)	I study with friends.		
Lower Secondary School	2 (4.0)	When I read, I mark or underline the important parts	23 (2.4)	I learn about things by actually seeing them.
	20 (3.9)	When I memorize things, I mark or underline them.	8 (2.5)	When I read a book, I sum it up in my own way.
	10 (3.9)	I solve problems from easiest to hardest.	12 (2.6)	When I don't understand, I ask the teacher.
	18 (3.8)	When taking notes, I underline important parts.	24 (2.7)	When I investigate something, I have my own way of looking at it.
	6 (3.5)	I listen carefully to points in class that seem important to me.	17 (2.8)	I look up other subjects related to the class materials.

13

Table-3. Results of factor analysis for study skills according to the data by the S-LA Questionnaire

	Primary School	Lower Secondary School	Upper Secondary School
	No.(loading) content	No.(loading) content	No.(loading) content
Cognitive	18(.71) When I read, I think about the main idea 14(.69) I read things over and over again to memorize. 1(.68) When I read, I mark or underline things.	21(.73) When I read, I think about the main idea. 11(.69) I concentrate on the main point while listening in class. 16(.69) I focus on the main point when I read.	21(.72) 11(.70) Same as the left column 16(.70)
Human contact	4(.62) I study with friends. 8(.42) I do problems by competeing with friends	23(.45) I learn about things by actually seeing them. 22(.39) I memorize things by competing with friends. 4(.37) I study with friends.	
Visual Cueing		20(.54) When I memorize things, I mark or underline them. . 18(.51) When taking notes, I underline important parts. 2(.39) When I read, I mark or underline the important parts	20(.60) Same as 18(.56) the left column 2(.46)
Searchings	5(.56) I use a dictionary to study. 7(.47) I look up things when I don't understand		
Voicing			9(.52) I read aloud. 19(.50) I memorize by saying things aloud.

Table-4. Items which are high and low in study motivation

	High		Low	
	No.(mean)	content	No.(mean)	content
Primary School	16 (3.9)	When a vacation begins, I make up a schedule for study and activity.	12 (2.5)	If I don't understand my teacher, I ask him questions.
	26 (3.7)	When I don't understand something, I don't leave it unfinished.	7 (2.6)	I review my lessons every day.
	21 (3.6)	I don't forget homework.	19 (2.6)	I enjoy new subjects.
	23 (3.6)	I finish my homework by myself, even when there is a lot of it.	22 (2.6)	I study well even for a short time.
	29 (3.5)	When class is to begin, I sit and wait for the teacher.	14 (2.7)	When I read, I collect the main points of the book.
	30 (3.3)	My desk is organized neatly.		
Lower Secondary School	16 (3.6)	When a vacation begins, I make up a schedule for study and activity.	12 (2.3)	If I don't understand my teacher, I ask him questions.
	30 (3.5)	My desk is organized neatly.	14 (2.4)	When I read, I collect the main points of the book.
	2 (3.3)	When there's a hard problem, I think about it many ways without giving up.	22 (2.4)	I study well even for a short time.
	25 (3.3)	I try to help my group do its job smoothly.	7 (2.5)	I review my lessons every day.
	26 (3.3)	When I don't understand something, I don't leave it unfinished.	15 (2.6)	When there is a difficult problem, I enjoy the challenge.
	29 (3.3)	When class is to begin, I sit and wait for the teacher.	24 (2.6)	I make a study schedule when a new term begins.

Table-5. Mean scores in study motivation by 8 different types of children

Type of children	Primary School	Lower Secondary School
. Relating	3. 2	3. 2
. Outreaching	3. 2	3. 1
. Seeking	2. 9	2. 9
. Forward	2. 9	2. 8
. Obedient	3. 4	3. 1
. Integrative	2. 9	2. 8
. Persevering	3. 0	2. 8
. Creative	3. 2	3. 1

Table-6. Mean study skill score for each factor among high vs low performance primary school pupils

	Primary School							
	Japanese		Social study		Arithmetic		Science	
	G	P	G	P	G	P	G	P
Cognitive	3.44 ··	2.36	3.35 ··	2.66	3.35 ··	2.52	3.23 ··	2.53
Human contact	3.46))	2.32	3.24 ··	2.56	3.33)	2.51	3.15 ··	2.55
Searching	3.86))	2.70	3.80)	2.94	3.85))	2.73	3.75)	2.84

)) : 1.0) : 0.8 ·· : 0.5

Table-7. Mean study skill score for each factor among high vs low performance lower secondary school pupils

	Lower Secondary School									
	Japanese		Social study		Mathematics		Science		English	
	G	P	G	P	G	P	G	P	G	P
Cognitive	3.47))	2.35	3.23 ··	2.51	3.25 ··	2.53	3.26 ··	2.55	3.25 ··	2.53
Visual cueing	4.22))	3.15	4.22)	3.26	3.96 ··	3.38	3.97 ··	3.36	4.06 ··	3.41
Human contact	2.92	2.55	2.97	2.58	3.03	2.54	2.87	2.62	2.97	2.51

)) : 1.0) : 0.8 ·· : 0.5

Table-8. Mean study skill score for each type of study motivation among high vs low performance primary school and lower secondary school pupils

	Primary School								Lower Secondary School									
	Japanese		Social study		Mathematics		Science		Japanese		Social study		Mathematics		Science		English	
	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P	G	P
. Relating	3.6 ⟩⟩	2.6	3.3	2.9	3.4 ··	2.8	3.4 ··	2.8	3.4 ··	2.7	3.4 ··	2.9	3.3 ··	2.8	3.2	3.0	3.4 ··	2.8
. Outreaching	3.8 ⟩⟩	2.5	3.7 ⟩	2.8	3.8 ⟩⟩	2.5	3.6 ⟩⟩	2.9	3.6 ⟩⟩	2.5	3.7 ⟩⟩	2.4	3.7 ⟩⟩	2.4	3.6 ⟩⟩	2.5	3.6 ⟩⟩	2.6
. Seeking	3.5 ⟩⟩	2.4	3.4	3.0	3.4 ⟩⟩	2.4	3.4 ··	2.8	3.4 ⟩⟩	2.3	3.4 ⟩⟩	2.4	3.3 ⟩	2.4	3.3 ⟩	2.4	3.3 ⟩	2.4
. Forward	3.5 ⟩⟩	2.2	3.3 ··	2.7	3.4 ⟩⟩	2.3	3.4 ⟩	2.6	3.4 ⟩⟩	2.2	3.4 ⟩⟩	2.1	3.1 ⟩	2.2	3.2 ⟩⟩	2.2	3.3 ⟩⟩	2.2
. Obedient	3.9 ⟩⟩	2.7	3.7 ··	3.0	3.9 ⟩⟩	2.7	3.6 ··	3.1	3.5 ⟩	2.7	3.5 ⟩	2.6	3.2 ··	2.6	3.2 ··	2.7	3.5 ⟩	2.7
. Integrative	3.4 ⟩⟩	2.3	3.2 ··	2.6	3.2 ··	2.5	3.1	2.7	3.1 ··	2.4	3.0 ··	2.5	2.8 ··	2.5	2.7	2.6	3.0 ··	2.5
. Persevering	3.8 ⟩⟩	2.3	3.6 ⟩	2.7	3.7 ⟩⟩	2.3	3.6 ⟩	2.7	3.4 ⟩⟩	2.4	3.5 ⟩⟩	2.3	3.3 ⟩⟩	2.3	3.3 ⟩⟩	2.3	3.4 ⟩⟩	2.3
Creative	3.8 ⟩⟩	2.6	3.5 ··	2.9	3.6 ⟩	2.7	3.4 ··	2.8	3.2 ··	2.7	3.2 ··	2.7	3.0	2.8	3.0	2.8	3.2 ··	2.7

⟩⟩ : 1.0 ⟩ : 0.8 ·· : 0.5

Table-9. Study skill items showing higher correlation (over 0.5) to study motivation

	Primary School	Lower Secondary school
. Relating	7, 14, 22	
. Outreaching	3,5,6,7,9, 14, 17,18, 21,22	15,16
. Seeking	3, 6,7,9, 14,15 17,18,19,21,22	7, 15, 21
. Forward	3, 6,7,9,10, 14, ,16,17,18,19,21	12
. Obedient	7, 17	
. Integrative	1, 7, 12,14,15,16,17,18,19	
. Persevering	6,7,9, 14, 17,18,19	7, 15
. Creative	14, 17, 22	

Table 10. Effects of computer output advice in a secondary school

ITEM		
Was the advice right?	Yes	129
	No	15
	DK	129
Did you practice according to the advice ?	Yes	36
	No	80
	DK	157
Will you practice according to the advice ?	Yes	206
	No	6
	DK	61

Table 11. Growth of study skills and study motivation in a secondary school in each of the items with higher points.

Study skills		Study motivation	
Item No.	0 1 2	Item No.	0 1 2
3		3	
5		4	
6		15	
7		18	
9		19	
10		20	
11		23	
17		27	
21		31	
23		32	